User's Manual

BuildEdge PLAN 3.1
for SketchUp

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OVERVIEW

BuildEdge PLAN is a plugin that expands upon the basic functionality of Trimble SketchUp software by simplifying and automating many of the processes associated with building design. BuildEdge PLAN allows users to quickly and easily draw and edit walls, doors, windows, floors, and roofs in 3D, eliminating countless steps required to accomplish the same tasks using SketchUp alone.

Document Scope and Format

The scope of this help document is limited to the use of the BuildEdge PLAN plugin. It does not contain information about how to use the host SketchUp application. That said, PLAN users who are new to SketchUp will find a brief list of SketchUp terminology listed in Appendix B of this document. Additional information about the use of SketchUp can be found via the SketchUp Knowledge Center.

This *BuildEdge PLAN User's Manual* is available in two formats; web-based, and PDF. Though the content of both versions is essentially identical, PDF format provides greater control and versatility in the layout and design of the manual's graphic elements. Therefore, we recommend the PDF version for users who wish to print the manual.

Our Commitment

BuildEdge products are made by Keymark; a small company with a long history of providing superior software solutions to the Architecture, Engineering and Construction industries. Keymark is committed to delivering products that greatly improve the efficiency and effectiveness of the design process. We welcome and encourage your comments and suggestions as an essential part of continually improving our products. Please feel free to contact us at BuildEdge@Keymark.com to let us know how we can better suit your needs and help you achieve your design goals.

WHAT'S NEW

Version 3.1

BuildEdge PLAN version 3.1 now includes the ability to hide extraneous join-lines for floors and roofs. After completing the drawing process, simply click on the "*Hide Edges*" button and PLAN 'erases' all those unwanted lines.

Prior to version 3.0, PLAN's doors and windows were represented by blank holes (openings) in walls. These blank holes were replaced by bonafide door and window components in PLAN version 3.0. After release, however, we had a number of customers request the ability to add blank holes once again, as well as the new door and window components. Ask and you shall receive; blank wall openings are once again an option.

Version 3.1 changes how walls are drawn in PLAN. In previous versions, walls were drawn based on guidelines that the plugin drew. That worked fine, until the guidelines were deleted and wall functionality became corrupted. Version 3.1 no longer relies on guidelines for drawing walls.

Version 3.0

BuildEdge PLAN version 3.0 includes new features and functions that make the process of drawing building models quicker and easier. One of our most exciting new features is the ability to draw walls, floors, and roofs with a single click of your mouse. For more information about new drawing functions, check out our training videos and see the sections in this manual entitled Auto-Wall Tool, Auto-Floor Tool, and Auto-Roof Tool.

Want more? In previous versions of PLAN, doors and windows were represented by blank holes (openings) in walls. PLAN's new door and window components now replace these featureless openings with horizontal and vertical dividers for windows, and your choice of seven realistic door types. You can even specify whether you want your doors to open "in" or "out" as well as the side on which your doors are to be hinged. Placing those doors and windows has gotten easier too. PLAN version 3.0 gives you the ability to snap the alignment of doors and windows to the endpoint or midpoint of wall. You can even use snap-points to align a new door or window to one that already exists on a wall above or below it.

Last but not least, PLAN now hides all extraneous join-lines between walls, so your models look structurally, architecturally, and aesthetically correct!

INSTALLING, UPGRADING, AND UPDATING BUILDEDGE PLAN

To install the BuildEdge PLAN plugin, you will need to have *Trimble SketchUp* already installed on your computer. BuildEdge PLAN works with Sketchup 8, SketchUp Make or Pro 2013, and SketchUp Make or Pro 2014.

The BuildEdge PLAN plugin is available in both a free and a full edition. The method used to install the plugin depends upon the version of SketchUp you are using, as well as the edition of BuildEdge PLAN – free or full – to be installed. (**Note:** Installation on Mac requires OSX 10.7, 10.8, or higher.)

TIP! To identify the version of SketchUp you are using, Windows users can go to the menu bar and select *Help → About SketchUp*. Mac users go to the menu bar and click on *SketchUp → About SketchUp*.

Installing the Free Edition of PLAN for SketchUp Version 8

The install file for the free edition of the BuildEdge PLAN plugin can be downloaded from the *SketchUp* web site here. Click on the *Download* button in the upper right-hand corner of the browser window to begin the download process. (See Figure 1 at right.)

Note: If you are not currently signed in to Google, the button in the upper right-hand corner of your screen will read *Sign In* rather than *Download*. If this is the case, go ahead and sign in to Google; you will then have the opportunity to download the install file.

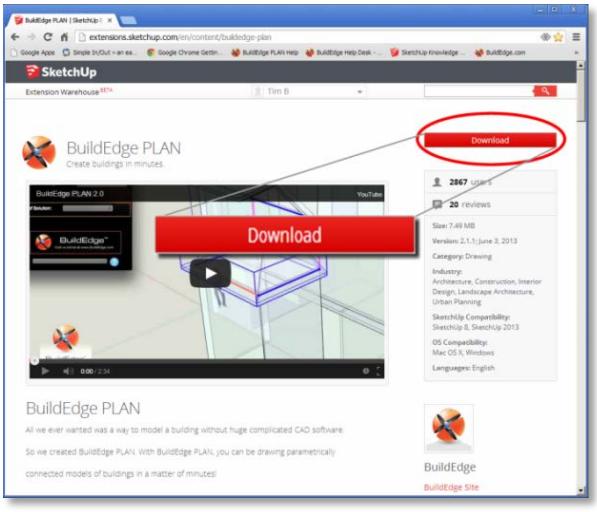


Figure 1: Click on the *Download* button.

Thanks for Downloading the
BuildEdge PLAN extension
Install
Tip:
SketchUp 2013's built-in Extension Warehouse browser enables you to install extensions with just one click!
Continue Browsing
Don't show this Message again

Figure 2: Click on the right-pointing arrow to begin the installation process.

Once the install file has finished downloading, the window shown in Figure 2 will pop open in your browser. Click on the right-pointing arrow in this pop-up window and you will be guided, step-by-step, through the installation process.

Installing the Free Edition of PLAN for SketchUp Make/Pro

The installation process for the free edition of BuildEdge PLAN is the same, whether you are using SketchUp 2013 or SketchUp 2014, and whether you are using the "Make" or the "Pro" edition. To begin, simply open your SketchUp application and, from the menu bar at the top of the page, select *Window* → *Extension Warehouse*, as pictured in Figure 3 at right. This opens the *SketchUp Extension Ware-house* home page shown in Figure 4 below.

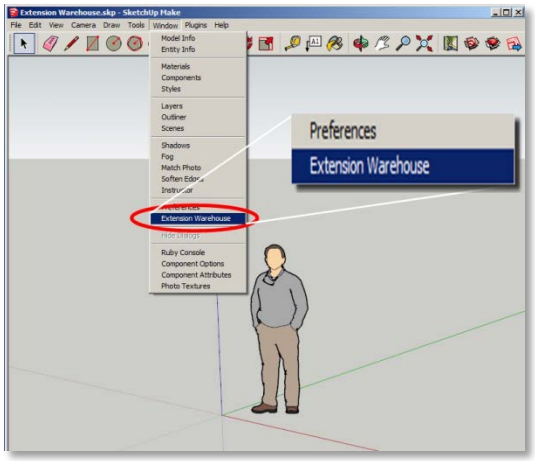


Figure 3: Select *Extension Warehouse* from the Window menu in SketchUp.

In the *Search* field in the upper right-hand corner of the *Extension Warehouse* page, type in *BuildEdge* and click on the *Search* icon. From the list of search results, click on *BuildEdge PLAN*. This will take you to the BuildEdge PLAN extension page shown in Figure 5. Click on the *Install* button in the upper right-hand corner of this window to begin the installation process.

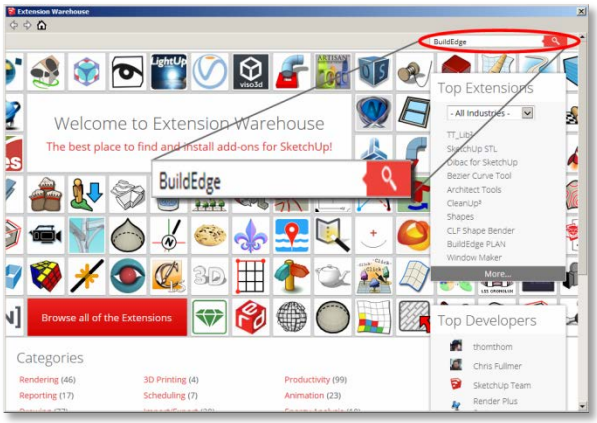


Figure 4: The *SketchUp Extension Warehouse* home page.

Note: If you are not currently signed in to Google, the button shown in Figure 5 will read *Sign In* rather than *Install*. If this is the case, go ahead and sign in to Google; you will then have the opportunity to install the plugin.

Once you click on the *Install* button, the remainder of the installation process is fully automated. When the PLAN plugin has completed the installation process, a message box will pop open stating that "The extension has been successfully installed and is now available for your use."

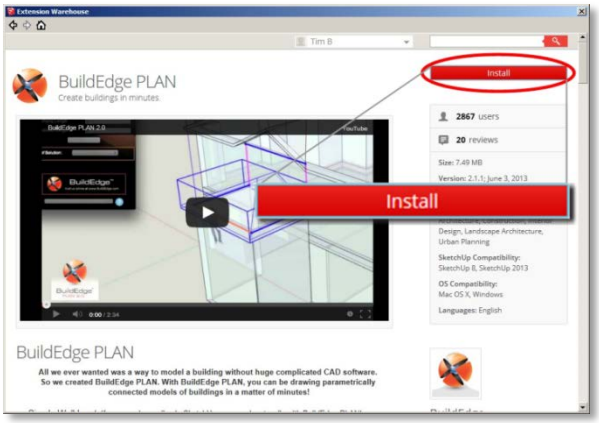


Figure 5: Once you click on the *Install* button, the rest of the installation process is completely automated.

Upgrading the Free Edition of PLAN to the Full Edition

How can you tell if you have the free edition of PLAN software installed on your machine? Well, first of all, the title bar of the PLAN window will read "BuildEdge PLAN – Free." (See Figure 6.) Second, the functionality of the free edition is limited to drawing walls and simple roofs. You will not have access to the *Door and Window Mode* or *Floor Mode*, and the icons for these functions will be grayed out. (Once again, refer to Figure 6.) To enjoy the full functionality of PLAN, you will need to purchase full edition from our store, located here.

Figure 6: Enter your *Serial Number* to upgrade to the *Full Edition* of PLAN.

Once you have completed the purchase process, you will receive a serial number for the product via email. Follow these simple steps to complete the upgrade:

1. Open the PLAN plugin from within the SketchUp application.
2. At the bottom of the PLAN window, click on the *Enter Serial Number* button pictured in Figure 6. A dialog box titled *Enter Serial Number* will pop open.
3. Type in the serial number you were provided and click on the *OK* button.

Once you have completed these steps, the remaining icons on the PLAN toolbar will automatically be activated, granting you full access to the complete set of PLAN's functions and features.

Installing the Full Edition of PLAN

To purchase and install the full edition of BuildEdge PLAN, open your internet browser to http://store.buildedge.com, as shown in Figure 7. In order to make your purchase and complete the download and installation process, you will first need to log on to the BuildEdge web site. Returning users can click on the *Login* link in the upper right-hand

corner of the window. New users will need to click on *Register* to complete the quick and easy registration process. (**Note:** The registration process simply consists of providing your name, email address, and entering a password.)

Once you have registered and/or logged on to the web site, locate the version of the plugin that coincides with your computer's operating system and click on the *Add To Cart* link. (See Figure 7.) Next, click on *View Cart* to review your order and, when ready, click on your desired method of payment. When you have completed the payment process, the web page will display your order-information details, including a *Serial Number* that you will need to start using your PLAN software. (**Note:** You may wish to print a copy of the order-information details web page for your records. Your order-information details will also be emailed to the address you used to register on the BuildEdge web site.) Next, complete the following steps:

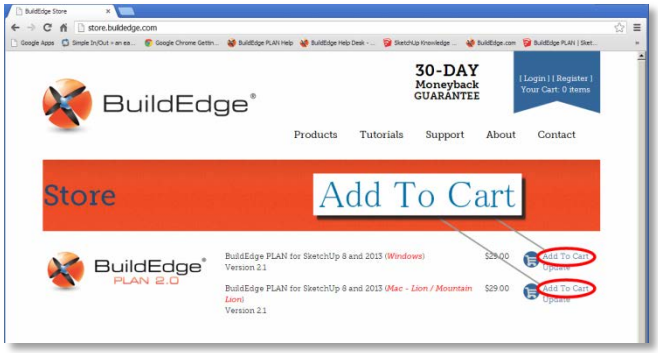


Figure 7: To purchase and install the full edition of PLAN, click on the *Add To Cart* link.

1. Near the bottom of the order-information details page, click on the *Download Link.* You will be prompted to enter a location to store the BuildEdge PLAN installation file. Enter a location of your choosing and click on the *Save* button.
2. Open the SketchUp application and, on SketchUp's menu bar, click on *Window* → *Preferences* to open SketchUp's *System Preferences* dialog box.
3. On the left-hand side of the *System Preferences* dialog box, click on *Extensions*, as pictured in Figure 8.
4. Click on the *Install Extension* button in the bottom left-hand corner of the *System Preferences* dialog box. An *Open* dialog box will appear.
5. From within the *Open* dialog box, navigate to the location where you saved your BuildEdge PLAN installation file. With the file selected, click on the *Open* button at the bottom of the dialog.

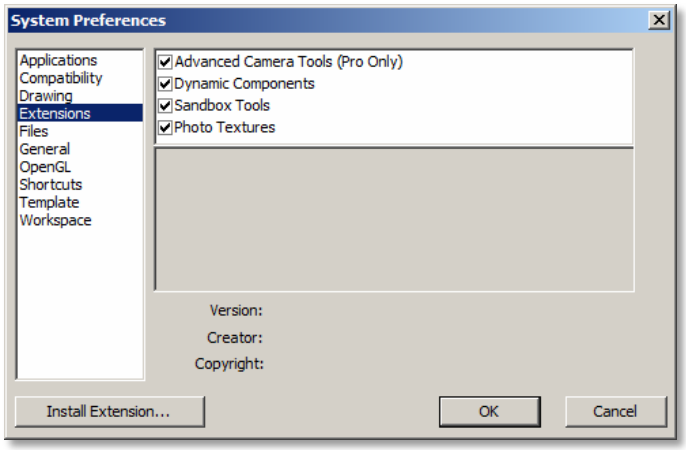
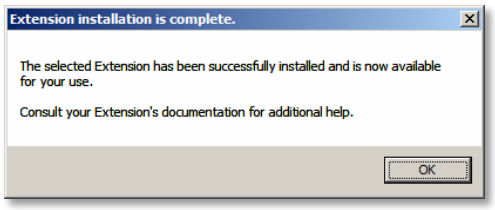


Figure 8: The System Preferences dialog box in SketchUp.

6. From this point forward, SketchUp completes the installation process on its own. When the process has completed, the message pictured at right will pop open on your screen.


Extension installation is complete.
The selected Extension has been successfully installed and is now available for your use.
Consult your Extension's documentation for additional help.
OK

7. Celebrate your successful installation in whatever manner you deem appropriate.

Updating the Full Edition of PLAN

Updates to the full edition of PLAN software are provided free of charge to registered users. To update your PLAN plugin, simply go to the BuildEdge PLAN web site, located here, and click on the *Update* link that corresponds with your computer's operating system. When the *Save As* dialog box pops open, enter a location to save the update-installation file and click on the *Save* button to close the *Save As* dialog box. To finish the installation process, complete steps two through seven in the section above.

Note: To identify the version of PLAN that you are currently using, go to the menu bar in SketchUp and click *Window* → *Preferences* to open the *System Preferences* dialog box shown in Figure 9. On the left side of the *System Preferences* dialog box, click on *Extensions* and then on the right side of the dialog, click on *BuildEdge PLAN*. The bottom of the *System Preferences* dialog box will then display the specific version of PLAN that is installed on your computer.

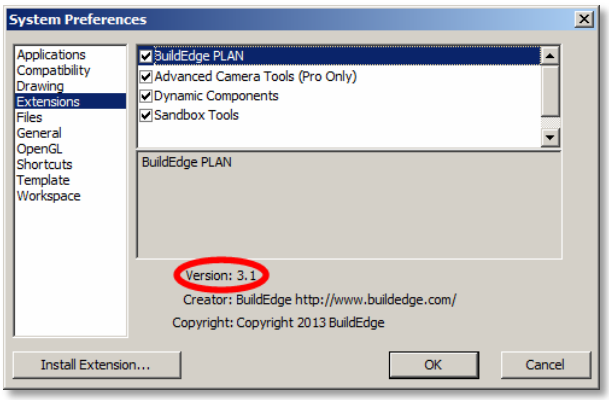


Figure 9: The version of PLAN installed on your computer can be found in the *System Preferences* dialog box.

THE INTERFACE BETWEEN SKETCHUP AND PLAN

Users who are new to PLAN occasionally have difficulty determining when to use the features and tools native to SketchUp and when to use those associated specifically with the PLAN interface. The topic is an important one because there is a fundamental difference between objects created using the tools found in PLAN and those in SketchUp. The key difference is that objects created using PLAN are parametrically connected; they have built-in intelligence that allows them to be moved and modified as a single, interrelated unit. Objects created using SketchUp's tools have no such built-in intelligence. They are "unaware" of BuildEdge PLAN data.

Objects created using PLAN and those created using SketchUp tools can coexist peacefully within the same drawing. That said, however, because of their different data types, editing and manipulating PLAN objects with SketchUp tools can have unintended and unwanted consequences. Therefore, it is best to modify PLAN objects using PLAN tools, unless specifically instructed to do otherwise.

WARNING! You cannot copy and paste BuildEdge PLAN objects within the SketchUp interface. Copied objects contain a combination of SketchUp and PLAN code and attributes that will eventually prove fatal to the success of your modeling efforts. ☹

GETTING STARTED

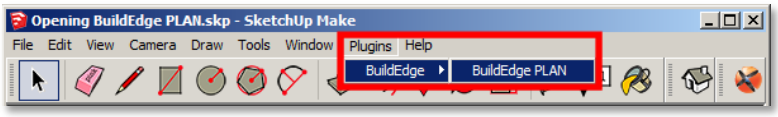
To begin using BuildEdge PLAN, first open your SketchUp software using the desired template. (**Note:** The examples pictured in this User's Manual have been created using SketchUp's "Architectural Design – Feet and Inches" template, however, PLAN can be used in conjunction with any of the SketchUp templates.)

TIP! To change the unit of measure used by PLAN, go to the SketchUp menu bar and select *Window* → *Model Info*. From within the *Model Info* dialog box, click on *Units* and select the desired measurement option from the corresponding drop-down list. To apply your changes, go back to the SketchUp menu bar and click on *Plugins* → *BuildEdge* → *BuildEdge PLAN*.

Opening BuildEdge PLAN

Once installed, there are two ways to open the BuildEdge PLAN plugin:

1. From the SketchUp menu bar, select *Plugins* → *BuildEdge* → *BuildEdge PLAN*.


Opening BuildEdge PLAN.skp - SketchUp Make
File Edit View Camera Draw Tools Window Plugins Help
BuildEdge
BuildEdge PLAN

2. Alternatively, you may simply click on the *BuildEdge PLAN* icon on the PLAN toolbar, as pictured in Figure 10.

If, for any reason, the BuildEdge PLAN toolbar shown in Figure 10 is <u>not</u> visible when you open SketchUp, Windows users can go to the menu bar in SketchUp and click *View* → *Toolbars*. Mac users go to *View* → *Tool Palettes*. Make sure the BuildEdge checkbox has been selected.

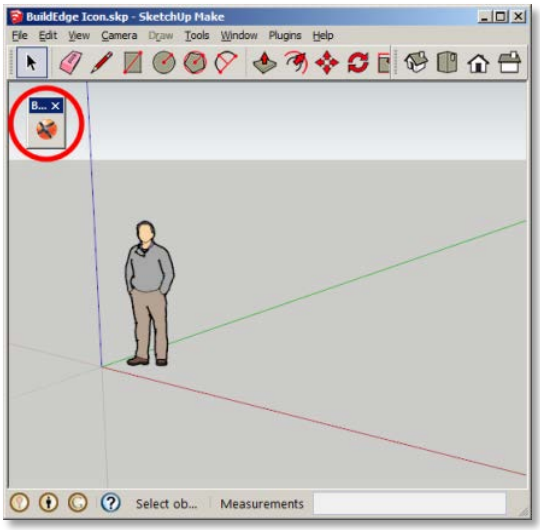


Figure 10: The BuildEdge PLAN toolbar

TIP! To dock the BuildEdge PLAN toolbar on the SketchUp toolbar, Windows-computer users can click on any corner of the PLAN toolbar and drag it onto a free area on the SketchUp toolbar. Mac users click on the *View* menu, select *Customize Toolbar*, and then drag the PLAN toolbar onto the Mac toolbar.

The BuildEdge PLAN Window

Regardless of the method used start the program, BuildEdge PLAN opens a window like the one pictured at right in Figure 11. The BuildEdge PLAN window consists of some components that are standard to all windows, as well as others that are unique to PLAN:

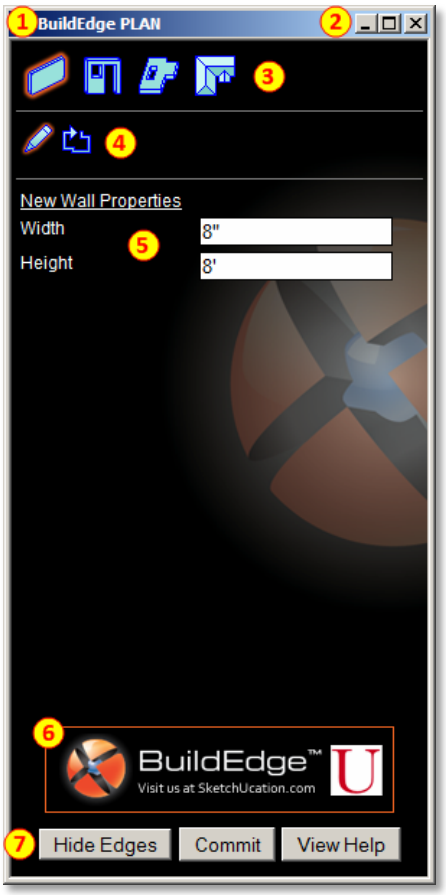


Figure 11: Parts of the PLAN window.

1. *Title bar* – A standard windows element that provides the name of the application being used; in this case, BuildEdge PLAN.
2. *Control buttons* – The standard-issue buttons used to minimize, maximize, or close the BuildEdge PLAN window. (Of course, if you are using a Mac, your control buttons look like this.) In addition to using the control buttons, you can change the width of the PLAN window by clicking and dragging on either its left or right edge. You can also move the PLAN window to any location on your desktop by clicking and dragging on the PLAN window's title bar.
3. *Mode toolbar* – PLAN-specific icons used to select the type of object to be created or modified; walls, doors and windows, floors, or roofs.
4. *Sub-toolbar* – A collection of mode-specific tools and icons.
5. *Property fields* – A list of elements used to define characteristics of the object type being drawn. The list of property fields differs depending on whether one is working in *Wall*, *Door and Window*, *Floor*, or *Roof Mode*.
6. *BuildEdge banner* – A link to BuildEdge product information.
7. *Command buttons* – A set of command buttons for hiding floor and roof lines, committing your model to SketchUp, and accessing PLAN's online help.

WALL MODE

When opened for the first time, the PLAN plugin defaults to *Wall Mode*, as can be seen by the fact that the *Wall Mode* icon is highlighted on the Mode toolbar. (**Note:** After using PLAN the first time, the application will open to the mode and tool last used.) There are two tasks that can be accomplished from within *Wall Mode*. The first is to create a new wall; the second is to modify an existing wall that has been created using PLAN. Let's start by creating a new wall.

Creating a New Wall

There are two different methods you can use to draw walls using PLAN software. The first method uses PLAN's drawing tool to create one wall at a time. This is the best method to use if you want highly granular control over the dimensions and placement of your walls. On the other hand, if you have already created a floor, you can use the *Auto-Wall* tool and have PLAN create your walls for you automatically.

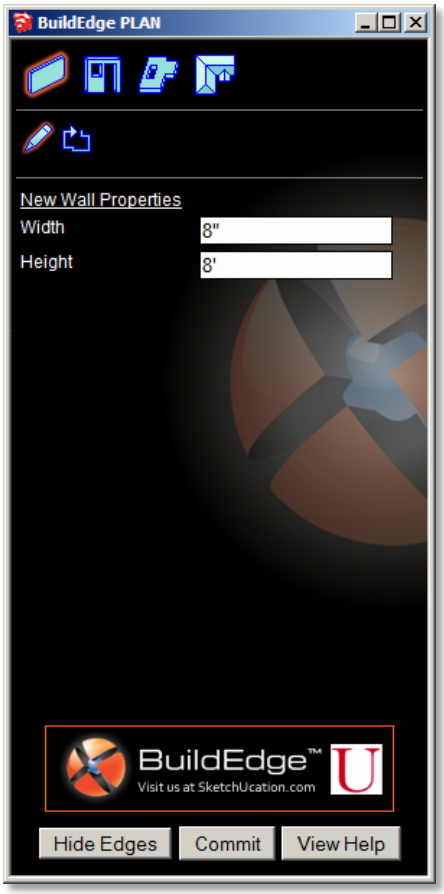


Figure 12: Enter the *Height* and *Width* for your walls in the property fields.

Regardless of the method you choose, before you begin drawing walls, you will need to enter the desired *Height* and *Width* for your walls in the property fields, as pictured in Figure 12. Once you've entered the *Height* and *Width* properties for your walls, you are ready to begin drawing.

DRAW WALL TOOL

The drawing tool is automatically activated when you enter *Wall Mode*. This tool is identical in shape and function to that of SketchUp's *Line* tool, except for the fact that the pencil is red when using the SketchUp *Line* tool, and blue when using the PLAN plugin. (**Note:** To deactivate the PLAN drawing tool, hit the *Escape* key on your keyboard.)

To draw a new wall, bring the drawing tool to a starting point of your choosing and then click and release your left mouse button. This creates the *Origin Point*. Notice that the *Origin Point* appears yellow in the SketchUp window. With the *Origin Point* now established – and the drawing tool active – begin to drag your mouse inside the SketchUp window.

As you drag your mouse, notice that there is not only a virtual line associated with the drawing tool, but a thicker "shadow line" as well. (See Figure 13 below.) This shadow is the *Orientation Line*, and it represents the actual location PLAN will use to draw your wall in relation to the virtual line. If the shadow appears centered on the virtual line, your wall will be drawn centered on the virtual line. Likewise, if the shadow appears on the inside of your virtual line, the wall will be drawn on the inside of the virtual line. Lastly, if the shadow appears on the outside of your virtual line, the wall will be drawn on the outside of that line.

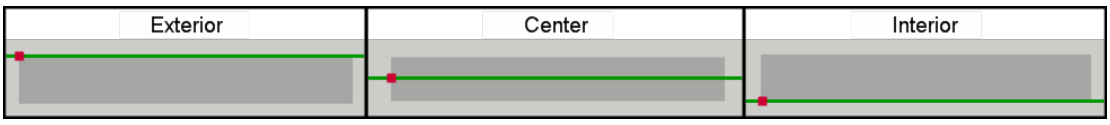


Figure 13: The *Orientation Line* appears as a shadow and shows the location where your wall will be drawn.

Use the left and right arrows on your keyboard to scroll through the three potential positions of *Orientation Line* placement. **Note:** You cannot change the orientation of a wall after it has been drawn.

Having established your *Origin Point* with the drawing tool – and with the virtual line and *Orientation Line* (shadow) active – the next step is to drag your drawing tool along the axis you would like the new wall to be drawn. You can draw your wall along SketchUp's green axis line (Y-axis) or the red axis line (X-axis) if you want, however, you are free to draw your wall without aligning to any of the SketchUp grid lines if you so choose.

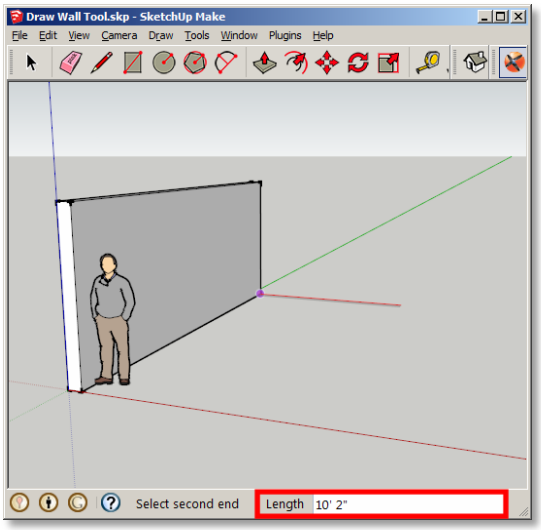


Figure 14: The length of the wall being drawn is displayed in the lower right of the SketchUp window.

As you drag your mouse to draw a wall, notice that the length of the wall is displayed in the lower right-hand corner of the SketchUp window, as shown in Figure 14. You are free to manually draw your wall to the specific length you want, however, with the drawing tool still active, the easiest approach is to simply type in the desired length for your wall using the number keys on your keyboard. When you have typed in the length and unit of measure you want, hit the *Enter* key on your keyboard. PLAN automatically draws the new wall to the length you specified.

The next step is to create a second wall connected to the first. You don't have to click your mouse to engage the drawing tool this time, however. Notice that the drawing tool remains active and automatically snaps to the endpoint of your first wall. The endpoint of your first wall now becomes the starting point for your next wall. Simply drag the drawing tool along the axis you want the second wall to be drawn. Type in the desired length of the second wall using the number keys on your keyboard and hit the *Enter* key on your keyboard. The new wall is rendered in 3D. Repeat this process until you have drawn all the walls for your model.

AUTO-WALL TOOL

If you have already created a floor structure to which you want to add walls, you can use PLAN's *Auto-Wall* feature instead of the drawing tool. Start by clicking on the *Auto-Wall* tool on the PLAN toolbar. Now, when you hover over the closed polygon of your floor, the entire floor becomes highlighted. Click anywhere on the highlighted floor and the *Auto-Wall* tool will generate walls around the entire floor structure, regardless of how complex it is.

TIP! The *Auto-Wall* feature also works in conjunction with two-dimensional objects drawn in, or imported into, the SketchUp interface. The only drawback is that walls drawn in relation to these objects are not parametrically connected to them.

Modifying or Deleting an Existing Wall

To edit the properties of an existing wall, click on the *Select* tool on the SketchUp toolbar or press the space bar on your keyboard. You can then select one wall at a time to edit by clicking anywhere on its face or edge. Note that when the wall has been selected, its outline changes from black to blue. With the wall selected, you can now use the wall property fields to edit its *Height* and/or *Width*. When you have typed your changes into the property fields, click on the *Apply Changes* button to save your changes.

Note: As of the current release, it is not possible to directly alter the *Length* property of a wall in PLAN. You can, however, alter the length of a wall by moving another wall to which it is connected.

To move an existing wall to a new location, begin by selecting it with the SketchUp *Select* tool. With your wall now selected (and outlined in blue) click on the *Move* tool on the SketchUp toolbar. With SketchUp's *Move* tool now activated, click and drag on the selected wall to move it to a new location of your choosing. Once the wall is placed where you want it, release your mouse button and the wall snaps into place, bringing all connected walls, roofs, floors, doors, and windows along with it.

WARNING! Using the SketchUp *Move* tool, walls will "stick" to any new location so long as that location is valid/viable. If you attempt to drag a wall to an invalid location (ex. outside the model's defined plane) the wall will snap back to its original location. Walls cannot intersect or overlap other walls to which they are not parametrically connected.

To delete a wall, simply select it using the SketchUp *Select* tool and hit the delete key on your keyboard.

A NOTE ABOUT SKETCHUP LAYERS

SketchUp uses layers to control the visibility of objects on the drawing surface. Individual objects, or entire groups of objects, can be tied to a specific layer and, thereby, turned on (made visible) or turned off (made invisible).

When you use BuildEdge PLAN to draw walls that are connected to one another, the connection points between these walls include extraneous lines. These lines are not architecturally correct and clutter up your drawing unnecessarily. PLAN uses a SketchUp layer, called the *BuildEdge Invisibility Layer*, to hide these unwanted lines from view.

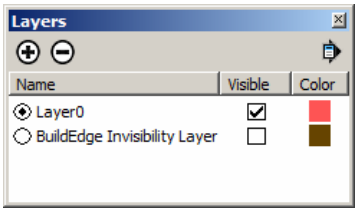


Figure 15: Viewing SketchUp layers.

Most of our users never have a need to work with (or even know about) this invisible layer. Just the same, we thought it worth mentioning for our experienced users who work with SketchUp layers on a regular basis. To access the *BuildEdge Invisibility Layer*, go to the SketchUp menu bar and select *Window* → *Layers*. When the SketchUp *Layers* dialog box opens (Figure 15), click in the Visible checkbox to toggle PLAN's invisible lines on and off.

DOOR AND WINDOW MODE

Door and Window Mode is used to add new doors and windows to your building, or to modify or delete existing doors and windows. To begin, click on the *Door and Window Mode* icon on the *Mode* toolbar in PLAN. The *Add Door/Window* tool is activated automatically.

Creating a New Window

To create a new window, go to the *Type* field and select *Window* from the drop-down list. This opens the *New Window Property Fields* pictured at right in Figure 16 and described as follows:

- *Type* – There are two window types to choose from: *Basic Window* and *Opening Only*.
- *Width* – The width of the window to be drawn. Enter a numeric value as well as the unit of measure. (For example, enter 4' 6" to create a window 4 feet 6 inches wide.)
- *Height* – The overall height of the window to be drawn. Enter a numeric value and the unit of measure. (For example, enter 848 mm to create a window 848 millimeters tall.)
- *Top of Window* – The distance between the bottom of the selected wall and the top-most portion of the window being drawn.
- *Horizontal Dividers* – The number of horizontal decorative grilles to be added to your window.
- *Vertical Dividers* – The number of perpendicular decorative grilles to be added to your window.
- *Trim Width* – The thickness of the decorative border that will surround your new window. If you do not want trim around your window, type zero (0) in the *Trim Width* field.

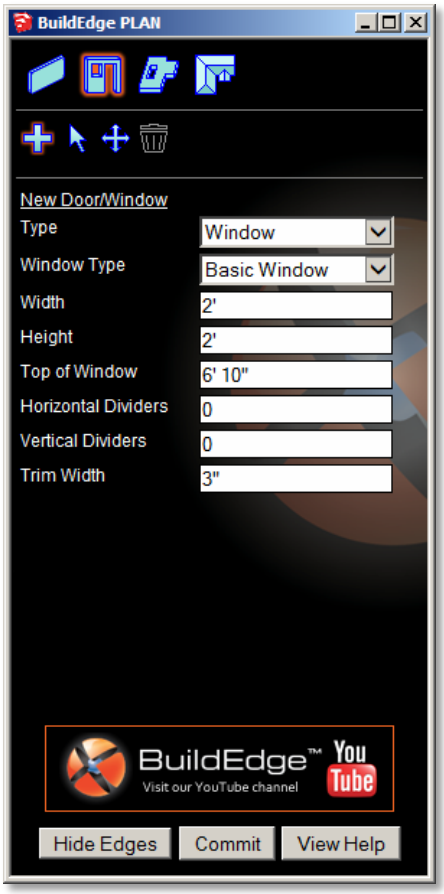


Figure 16: Property fields for a new window.

After you have entered the desired values in the *Window Property Fields*, you are ready to place your new window on its target wall. By defining the *Height* and *Top of Window* properties for your window, you have already specified where it is to be placed on the vertical axis of the target wall. All that remains is to define where the window is to be placed on the wall's horizontal axis – left, right, center, or any point between.

To start, place your cursor over the target wall and click once with your left mouse button. A blue outline of your new window will appear on the target wall. A solid blue line is used to represent a window that will be drawn with the trim facing the user. A dotted blue line represents a window that will be drawn with the trim on the opposite side of the wall –

facing away from the user. Use the up and down arrow keys on your keyboard to toggle between these two trim orientations.

In addition to the blue outline for your window, you will also see a tape-measure guide, as pictured in Figure 17. The tape-measure guide can be used to specify the exact placement of your window. It provides four different measurement options:

1. Left edge of the wall to the center point of the window (Figure 17).
2. Left edge of the wall to the left edge of the window.
3. Right edge of the wall to the center point of the window.
4. Right edge of the wall to the right edge of the window.

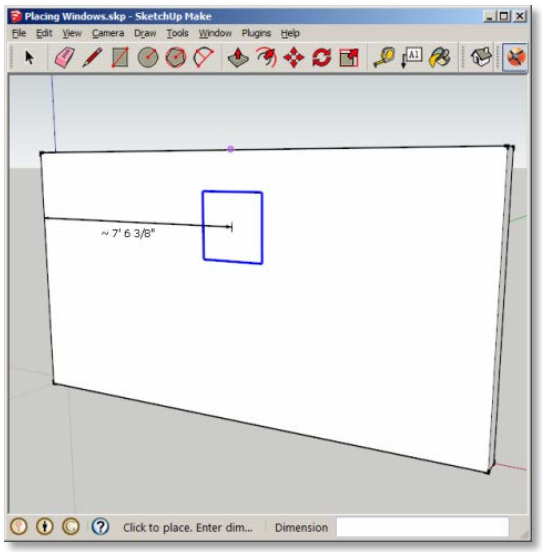

Placing Windows.skp - SketchUp Make
File Edit View Camera Draw Tools Window Plugins Help
~ 7' 6 3/8"
Click to place. Enter dim...
Dimension

Figure 17: Use the tape-measure guide to help place windows precisely.

To toggle through these four different tape-measure positions, use the left and right arrow keys on your keyboard. With the tape-measure guide active, type in the desired coordinates for the window on your keyboard and hit the *Enter* key to affix the window to its new location.

Instead of using the tape-measure guide to place your window, you can use your mouse to drag the window to the desired location. Using this drag-and-drop technique, you can make use of standard snap-points to align your window with the endpoint or midpoint of the target wall. You can even use snap-points to align the window with a door or window that exists on a wall above or below the target wall. Once you have dragged the window to where you want it, click the left button on your mouse to lock the window in place.

Creating a New Door

To create a new door, go to the *Type* field and select *Door* from the drop-down list. This opens the *New Door Property Fields* pictured in Figure 18 and described as follows:

- *Door Type* – The style of door to be added to your model. There are eight different types to choose from, including: *Swing*, *Double*, *Bifold*, *Double Bifold*, *Bypass*, *Garage*, *Cased Opening, and Opening Only*.
- *Width* – The width of the door to be drawn. Enter a numeric value as well as the unit of measure. (For example, enter 3' to create a door three feet wide.)
- *Height* – The overall height of the door to be drawn. Enter a numeric value as well as the unit of measure. (For example, enter 2082 mm to create a door 2,082 millimeters tall.)
- *Trim Width* – The thickness of the decorative border that will surround your new door. If you do not want trim around your door, type zero (0) in the *Trim Width* field.

Figure 18: New door property fields.

After entering values in the *New Door Property Fields*, the final step is to place your door on its target wall. By defining the *Height* property for your door, you have already specified where it is to be placed on the vertical axis of the target wall. All that remains is to define where the door is to be placed on the wall's horizontal axis – left, right, center, or any point between.

To start, place your cursor over the target wall and click once with your left mouse button. A blue outline of your new door will appear on the target wall. In addition to the blue outline for your door, you will also see a tape-measure guide, as pictured in Figure 19. The tape-measure guide can be used to specify the exact placement of your window. It provides four different measurement options:

1. Left edge of the wall to the center point of the door.
2. Left edge of the wall to the left edge of the door.

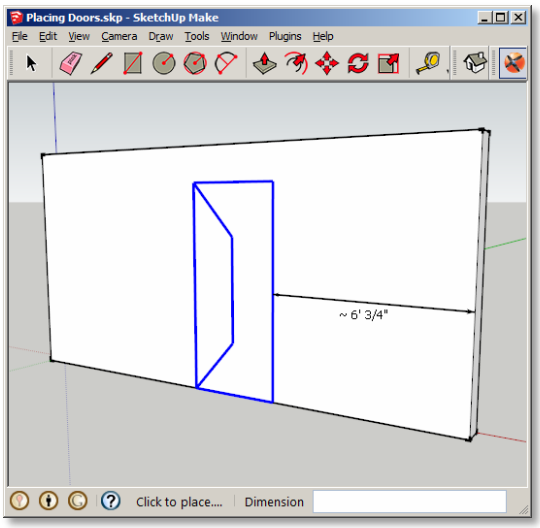


Figure 19: The tape-measure guide provides a handy reference for placing doors precisely.

3. Right edge of the wall to the center point of the door.
4. Right edge of the wall to the right edge of the door (Figure 19).

To toggle through these four different tape-measure positions, use the left and right arrow keys on your keyboard.

Instead of using the tape-measure guide to place your door, you can use your mouse to drag the door to the desired location. Using this drag-and-drop technique, you can make use of standard snap-points to align your door with the endpoint or midpoint of the target wall. You can even use snap-points to align the door with a window or door that exists on a wall above or below the target wall.

Whether you are using the tape-measure guide or the drag-and-drop technique, before you fix your door in place, you must decide upon its swing direction. (That is, the direction the door is to open – in or out.) For hinged-door types, you must also decide whether the hinges are to be placed on the right or left side of the door. Use the up and down arrow keys of your keyboard to toggle through the "hinge and swing" options for your particular door type, as pictured in Figure 20.

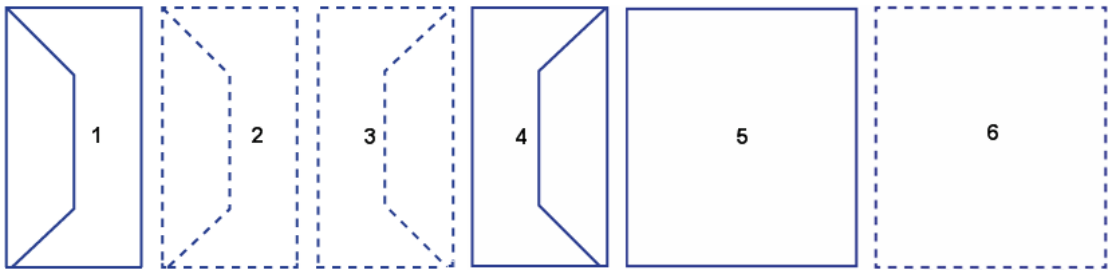


Figure 20: Use your keyboard's up and down arrow keys to toggle between "hinge and swing" options for your door: 1) hinge on viewer's left, swing toward viewer; 2) hinge on viewer's left, swing away from viewer; 3) hinge on viewer's right, swing away from viewer; 4) hinge on viewer's right, swing toward viewer; 5) swing toward viewer; 6) swing away from viewer.

With your door properly placed and its hinge and swing options selected, hit the *Enter* key on your keyboard to fix your door in place if you are using the tape-measure guide. If you are using the drag-and-drop technique, click the left button on your mouse to lock the door in place.

WARNING! When positioning objects on their horizontal axes you are automatically prevented from placing a door or window so that it overlaps another, or placing a door or window over the intersection point of two or more walls.

Getting into the Swing

As an extra added bonus, once your doors have been created, you have the option to swing them open and closed. To do so, go to the SketchUp menu bar and click on *Tools* → *Interact*. Your cursor will change into a hand with a pointing index finger. Move the index finger anywhere over the face of your door and click once with your mouse. The door opens.

Click on the face of the door again and it closes. Repeat this process as many times as you wish, until the novelty wears off. To *SLAM* your door shut, hold down the *Control* key on your keyboard while you….Just kidding, you can't actually slam your door shut. ☺

Modifying or Deleting an Existing Door or Window

To modify an existing door or window, click on the *Select Door/Window* tool on the PLAN toolbar and then click on the opening you want to change. You can select a new door type and/or change the hinge and swing properties of your door. For windows, you can change the number of vertical and/or horizontal dividers used. Likewise, you can alter the trim measurements of both doors and windows. When you are done, click on the *Apply Changes* button to save your modifications.

To move an existing door or window to a new location, begin by clicking on the *Move Door/Window* icon on the PLAN toolbar. Next, click on the opening you would like move and drag your mouse to the desired location. Click your mouse one more time to anchor the door or window to its new location. Alternatively, with the tape-measure guide active, you can type in numeric values for the new location and hit *Enter* on your keyboard.

To delete an existing door or window, click on the *Select Door/Window* tool on the PLAN toolbar. Next, select the door or window you would like to delete by clicking on it. With the opening now selected, return to the PLAN toolbar and click on the *Delete Door/Window* icon. Job done!

WARNING! When deleting doors and windows, it is important to use PLAN's *Delete Door/Window* tool. If the SketchUp *Select* and *Erase* tools are used instead, the deletion will be temporary, and the opening will eventually reappear in your model.

Updating Legacy Doors and Windows

As you may know, previous versions of BuildEdge PLAN did not offer users the ability to add door and window components to their models. Instead, users were restricted to adding simple holes/openings in walls to represent doors and windows.

We here at BuildEdge realize that we have users who have created large, complex models using previous versions of our software. Therefore, in this latest version of PLAN, we have included the ability to update legacy door and window "openings" to full-fledged door and window components.

To convert a legacy door or window to the new, improved door and window format, begin by clicking on the *Select Door/Window* tool on the PLAN toolbar. Next, click on the door or window to be updated. With your opening now selected, you can modify its properties in the PLAN window as you see fit. A legacy window can be updated as either a window or a door in the new format. Likewise, a legacy door can be transitioned to either a door or a window in the new format. When you have modified legacy openings to your satisfaction, click on the *Apply Changes* button to save your changes and complete the update process. **Note:** Legacy doors and windows must be updated individually, one at a time. PLAN does not support the simultaneous selection and modification of multiple objects at this time.

FLOOR MODE

Clicking on the *Floor Mode* icon brings up the PLAN *Floor Mode* window pictured at right in Figure 21. There are two tasks that can be accomplished in *Floor Mode*. The first is to create a new floor; the second is to modify an existing floor that has been created using PLAN. The *Floor Mode* toolbar includes icons for eight different functions, as seen highlighted in red in Figure 21:

1. *Edit Floor Outline* – Used to modify the properties of an existing floor.
2. *Draw Tools* – Provides two different tools for drawing floors one edge at a time.
3. *Auto-Floor* – Used to create a floor around contiguous walls with a single click of the mouse.
4. *Select Floor Line* – Used to highlight a single line (i.e. outline edge) of a floor.
5. *Move Floor Line* – Allows the user to move a selected floor line to a new location.
6. *Delete Floor Line* – Used to delete a selected floor line.
7. *Save Changes* – Saves changes implemented by the user during the process of editing a floor's outline.
8. *Abandon Changes* – Removes changes implemented by the user during the process of editing a floor's outline.

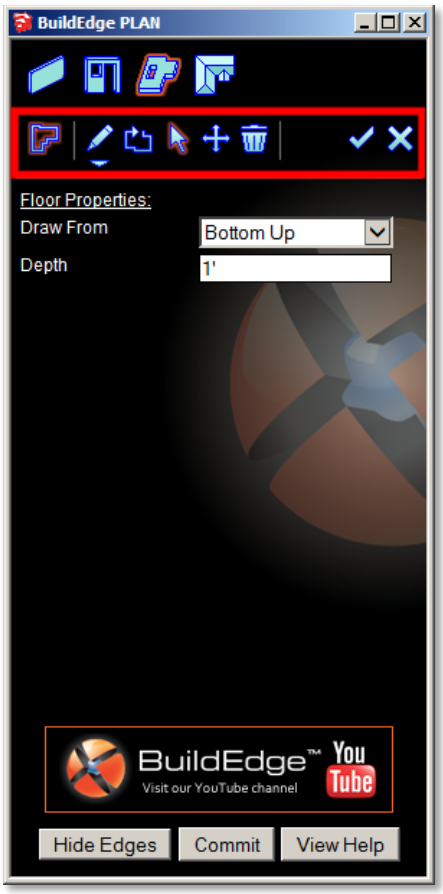


Figure 21: *Floor Mode* toolbar in PLAN.

We will discuss these eight functions at length, within the context of creating new floors and modifying or deleting existing ones.

Creating a New Floor

Referring back to Figure 21 once again, you can see that there are just two property fields associated with floors:

1. *Draw From* – Provides two options for drawing your floor. When you select *Bottom Up,* the floor you draw will sit "on top" of the walls to which it is connected. Selecting the *Top Down* option will draw a floor that "hangs down" into the space of the walls on which it sits.
2. *Depth* – The thickness of the floor that is to be created.

TIP! In order for walls to be parametrically connected to a floor – so that they can be moved and resized as a unit – the walls must be drawn first. If you are drawing a floor between the first and second stories of a building (Figure 22), you must use the *Bottom Up* option (in the *Draw From* property field) to retain the ability to draw second-story walls that are parametrically connected to your floor.

Once you have entered values into these two property fields, you are ready to begin drawing your floor. There are three different PLAN tools you can use to draw your floor: the *Draw Floor Line* tool, the *Pick Line* tool, and the *Auto-Floor* tool.

- *Draw Floor Line* – If you want to draw floor lines that are not connected to walls, this is the tool you need. The *Draw Floor Line* tool allows you to draw floor lines manually, one edge at a time.
- *Pick Line* – The *Pick Line* tool draws floor lines, connected to walls, one edge at a time. Simply click anywhere on a wall and the *Pick Line* tool creates a floor line tied to that wall. The side of the wall you click on determines whether the floor line is placed on the inside edge or outside edge of that wall.
- *Auto-Floor* – If you have already created a set of walls that form a closed polygon, you can use the *Auto-Floor* tool to create an entire floor with a single click of your mouse.

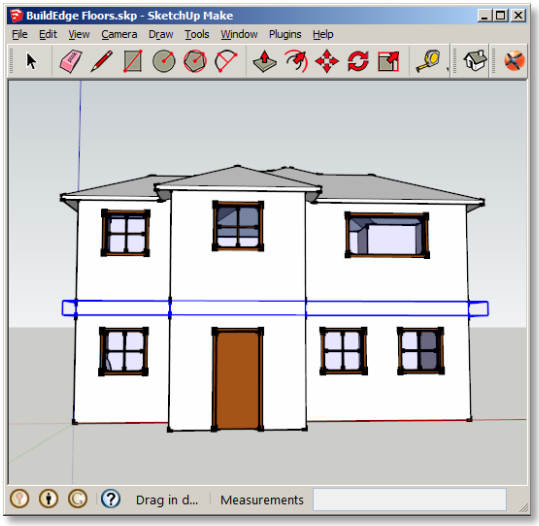


Figure 22: A "Bottom Up" floor separates the two stories of this house.

We will now turn to a more detailed examination of how these drawing tools are used.

DRAW FLOOR LINE TOOL

To draw a floor manually, click on the *Draw Floor Line* icon on the PLAN toolbar. In the SketchUp window, click and release the left button of your mouse to establish the desired starting point for your floor. With the starting point now established – and the drawing tool still active – the next step is to drag your drawing tool along the axis you would like the new floor line to be created. You can draw the floor line along SketchUp's green axis line (Y-axis) or the red axis line (X-axis) if you want, however, you are free to draw your floor without aligning to any of the SketchUp grid lines if you so choose.

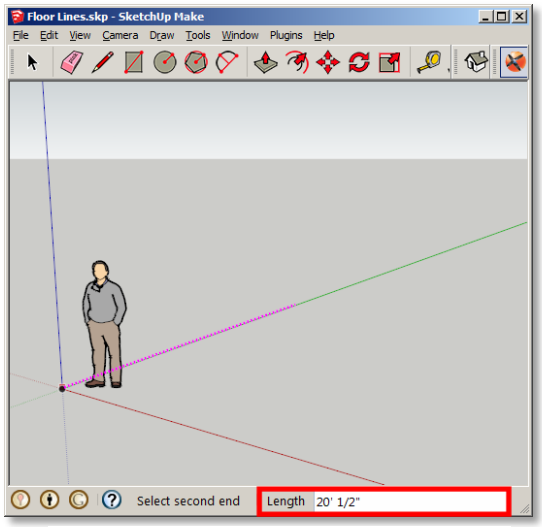


Figure 23: The length of your floor line is displayed in the lower right of the window.

As you drag your mouse to draw a floor line, notice that the length of the line is displayed in the lower right-hand corner of the SketchUp window. (See Figure 23.) You are free to manually draw your floor line to the specific length you want, however, with the drawing tool still active, the easiest approach is to type in the desired length of your floor line using the number keys on your keyboard. When you have typed in the length you want, simply hit the *Enter* key on your keyboard. If

you are drawing a floor line on top of a wall, you may elect to simply click on the start-point and end-point of the wall. Your new floor line will snap to the selected points on the wall below it.

PICK LINE TOOL

To draw floor lines on top of walls quickly, click on the *Pick Line* tool from the PLAN toolbar. Click anywhere on the face or edge of each of wall and the floor line is drawn for you automatically. Once again, the side of the wall you click on determines whether the floor line is placed on the inside edge or outside edge of that wall. When the last line of your floor has been drawn – and the polygon that represents your floor has been closed on all sides – PLAN automatically draws the floor to the dimensions you specified.

AUTO-FLOOR TOOL

As mentioned previously, if you have already created a set of walls that form a closed polygon, you can use the *Auto-Floor* tool to create an entire floor with a single click of your mouse. Simply click on the *Auto-Floor* icon on the PLAN toolbar and place your cursor anywhere within your closed polygon of walls. *Auto-Floor* selects all of your walls automatically, highlighting them in blue. With your walls highlighted, simply click once with your left mouse button. *Auto-Floor* draws a complete floor for you, no matter how complex your structure is.

Regardless of the tool used to create it, your newly drawn floor is displayed in x-ray view, allowing you to see all lines – top, bottom, and side – associated with your model. You can turn x-ray view on and off using the *View* menu on the SketchUp menu bar.

Note: Once drawn, floor lines attached to walls are displayed in blue; floor lines unattached to walls are displayed in pink. Individual lines highlighted with the PLAN's *Select Floor Line* tool appear in orange.

Modifying or Deleting an Existing Floor

To modify the properties of an existing floor, or to delete all or part of a floor, begin by clicking on the *Select* tool on the SketchUp toolbar. Next, click on the floor to select it. Note that, when the entire floor has been selected, its outline changes from black to blue. From here, the next step you take depends upon the task you wish to complete:

- To delete the entire floor, hit the delete key on your keyboard.
- To modify *Depth* and/or *Draw From* properties for the entire floor, type your changes into the property fields and then click on the *Apply Changes* button.
- To move an individual floor line, click on the *Edit Floor Outline* icon on the PLAN toolbar. This places the selected floor in edit mode. Next, click on the *Select Floor Line* tool on the PLAN toolbar and click on the specific floor line you wish to move. Lastly, click on the *Move Floor Line* icon on the PLAN toolbar, and then click and drag the selected floor line to its new location.
- To delete an individual floor line, click on the *Edit Floor Outline* icon on the PLAN toolbar. Next, click on the *Select Floor Line* tool on the PLAN toolbar and click on the specific floor line you wish to delete. Finally, click on the *Delete Floor Line* icon on the PLAN toolbar.

When you are satisfied with your changes, click on the *Save Changes* icon on the PLAN toolbar. To discard your changes click on the *Abandon Changes* icon on the PLAN toolbar.

TIP! You cannot click on the *Save Changes* button to save your floor until the last side of the polygon has been drawn.

Hiding Floor & Roof Lines

Once you are done drawing your model, it is easy to remove extraneous floor and roof lines by clicking on the "Hide Edges" button in the PLAN window. Figure 24 (below) shows a side-by-side comparison of a model with the floor and roof lines present, and with these lines hidden. **Note:** If you move your walls, floors, and/or roofs around after hiding lines, the lines may reappear as the moved objects are redrawn. Simply click on the "Hide Edges" button once again to tidy up.

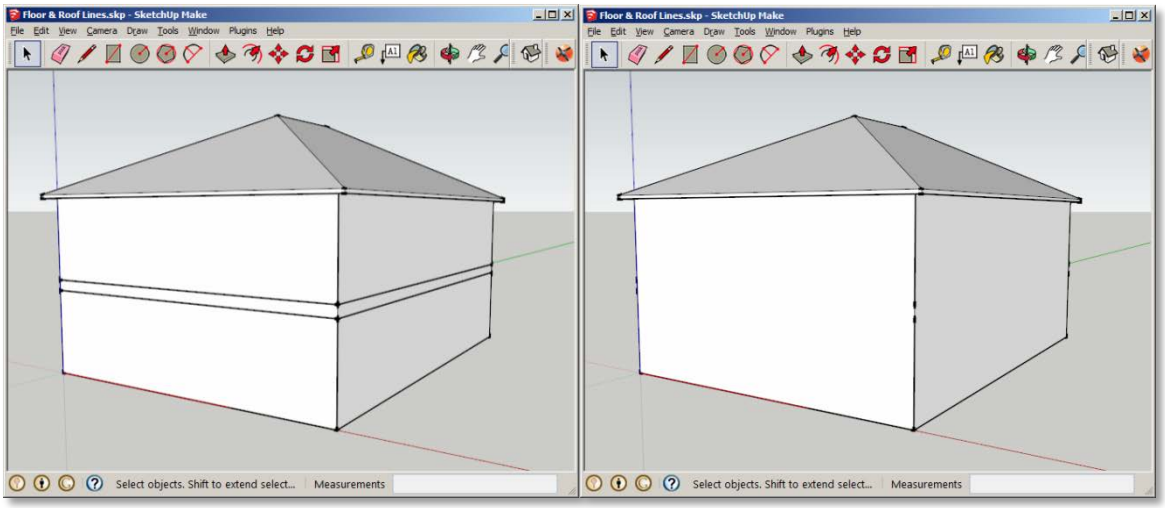

Floor & Roof Lines.skp - SketchUp Make
File Edit View Camera Draw Tools Window Plugins Help
Select objects. Shift to extend select...
Measurements
Floor & Roof Lines.skp - SketchUp Make
File Edit View Camera Draw Tools Window Plugins Help
Select objects. Shift to extend select...
Measurements

Figure 24: To hide extraneous floor and roof lines, click on the "Hide Edges" button in the PLAN window.

ROOF MODE

There are two tasks that can be accomplished from within *Roof Mode*. The first is to create a new roof; the second is to modify or delete an existing roof that has been created using PLAN. As seen in Figure 25 at right, the *Roof Mode toolbar* includes icons for eight different functions:

1. *Edit Roof Outline* – Used to modify the properties of an existing roof.
2. *Draw Tools* – Provides two different tools for drawing roofs one edge at a time.
3. *Auto-Roof* – Used to create a roof around contiguous walls with a single click of the mouse.
4. *Select Roof Line* – Used to highlight a single line (i.e. outline edge) of a roof so that you can move it or edit its properties.
5. *Move Roof Line* – Allows the user to move a selected roof line to a new location.
6. *Delete Roof Line* – Deletes the selected roof line.
7. *Save Changes* – Saves changes implemented by the user during the process of editing a roof's outline.
8. *Abandon Changes* – Removes changes implemented by the user during the process of editing a roof's outline.

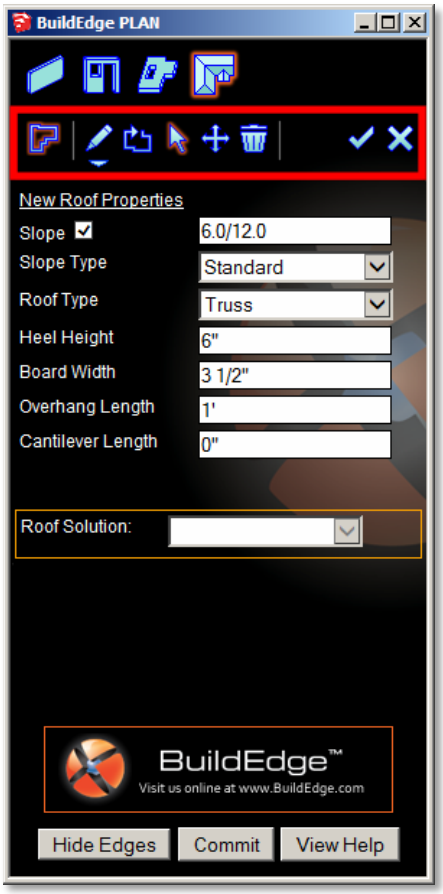


Figure 25: *Roof Mode* toolbar in PLAN.

Creating a New Roof

Regardless of the method used to draw your new roof (*Draw* tool, *Pick Line*, or *Auto-Roof*), when you first enter *Roof Mode*, the place to start is to enter information into the property fields pictured in Figure 25 above. These properties establish the parameters PLAN will use to draw your roof:

1. *Slope* – The angle or slant of a roof's incline. The slope can be defined as an angle, percent, or as the ratio of rise to run. To define a slope as an angle or percent, simply type in a number. To define the slope as a ratio, type in two values separated by a forward slash or colon. (For example 6/12 or 6:12.) If your roof will not have any slope at all, make sure to uncheck the *Slope* checkbox.
2. *Slope Type* – Defines the style of the slope, which can be *Standard Slope*, *Single Parallel*, or *Double Parallel*, as seen in Figure 26.
3. *Roof Type* – Displays the original style of the roof

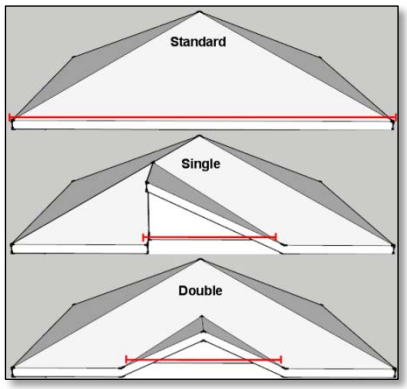


Figure 26: Slope types: Standard, Single Parallel, and Double Parallel.

design; either *Truss* or *Rafter*. Changing this value alters how the heel height of the roof is calculated and drawn.

4. *Heel Height* – The vertical distance from the top of a wall to the top of the roof at the end of the heel. Only applicable to truss roof types. (See Figure 27.)
5. *Seat Cut* – A notch cut in the bottom part of a rafter that creates a resting surface for the rafter as it sits on top of its supporting wall. Only applicable to rafter roof types. (See Figure 28.)
6. *Board Width* – For truss roof types, *Board Width* represents the width of the top chord. For rafter roof types, it is the width of the rafter.
7. *Overhang Length* – The horizontal distance the roof hangs over the wall below it.
8. *Cantilever Length* – The horizontal offset of the heel from the wall.

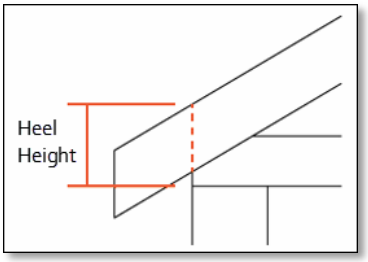


Figure 27: Heel Height dimensions.

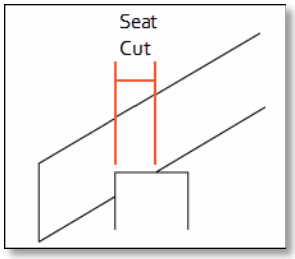


Figure 28: Seat Cut dimensions.

WARNING! PLAN will generate an "Invalid Length" error message if you set the *Board Width* value too high in relation to the *Heel Height* or, conversely, if you set the value of the *Heel Height* too small in relation to the *Board Width*.

Once you have entered values into the property fields, you are ready to begin drawing your roof. There are three different PLAN tools you can use to draw your roof: the *Draw Roof Line* tool, the *Pick Line* tool, and the *Auto-Roof* tool.

- *Draw Roof Line* – If you want to draw roof lines that are not connected to walls, this is the tool you need. The *Draw Roof Line* tool allows you to draw roof lines manually, one edge at a time.
- *Pick Line* – The *Pick Line* tool draws roof lines, connected to walls, one edge at a time. Simply click anywhere on a wall and the *Pick Line* tool creates a roof line tied to that wall. The side of the wall you click on determines whether the roof line is placed on the inside edge or outside edge of that wall.
- *Auto-Roof* – If you have already created a set of walls that form a closed polygon, you can use the *Auto-Roof* tool to create an entire roof with a single click of your mouse.

We will now turn to a more detailed examination of how these drawing tools are used.

DRAW ROOF LINE TOOL

To draw a roof manually, click on the *Draw Roof Line* icon on the PLAN toolbar. In the SketchUp window, click and release the left button of your mouse to establish the desired

starting point for your roof. With the starting point now established – and the drawing tool still active – the next step is to drag your drawing tool along the axis you would like the new roof line to be created. You can draw the roof line along SketchUp's green axis line (Y-axis) or the red axis line (X-axis) if you want, however, you are free to draw your roof without aligning to any of the SketchUp grid lines if you so choose.

As you drag your mouse to draw a roof line, notice that the length of the line is displayed in the lower right-hand corner of the SketchUp window. (See Figure 29.) You are free to manually draw your roof line to the specific length you want, however, with the drawing tool still active, the easiest approach is to type in the desired length of your roof line using the number keys on your keyboard. When you have typed in the length you want, simply hit the *Enter* key on your keyboard. If you are drawing a roof line on top of a wall, you may elect to simply click on the start-point and end-point of the wall. Your new roof line will snap to the selected points on the wall below it.

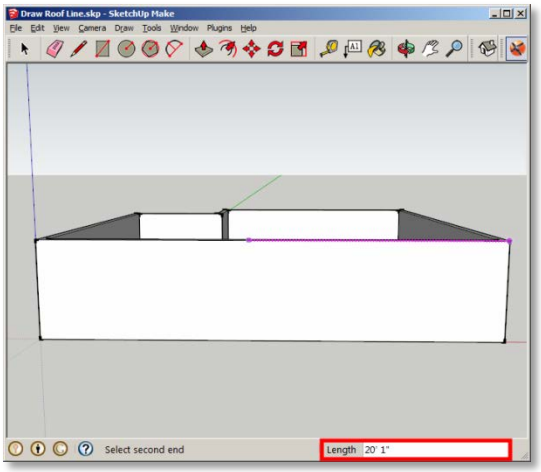


Figure 29: Roof-Line length shown in SketchUp.

PICK LINE TOOL

To draw roof lines on top of walls quickly, click on the *Pick Line* tool from the PLAN toolbar. Click anywhere on the face or edge of each of wall and the roof line is drawn automatically. Once again, the side of the wall you click on determines whether the roof line is placed on the inside edge or outside edge of that wall. When the last line of your roof has been drawn – and the polygon that represents your roof has been closed on all sides – PLAN automatically draws the roof to the dimensions you specified.

AUTO-ROOF TOOL

As mentioned previously, if you have already created a set of walls that form a closed polygon, you can use the *Auto-Roof* tool to create an entire roof with a single click of your mouse. Simply click on the *Auto-Roof* icon on the PLAN toolbar and place your cursor anywhere within your closed polygon of walls. *Auto-Roof* selects all of your walls automatically, highlighting them in blue. With your walls highlighted, simply click once with your left mouse button. *Auto-Roof* draws a complete roof for you.

Regardless of the tool you use, once you finish drawing your roof, PLAN calculates a valid solution and renders the roof in 3D. If you have created a model that is not sound enough architecturally to support a roof structure, PLAN will generate an error message stating that "No roof solutions could be found." If this is the case, you will need to rework your wall structures into a viable design before you can draw your roof.

Depending on the roof being drawn, the PLAN window may indicate that it has generated more than one potential roof solution. (See Figure 30 on the following page.) To view the various solution alternatives, click on the down arrow in the *Roof Solution* field and select

the solutions one at a time to view them. When you have selected the *Roof Solution* you wish to implement, click on the *Save Changes* button. To discard the roof solution, click on the *Abandon Changes* button.

Figure 30: PLAN may generate multiple roof design alternatives.

Note: Once drawn, roof lines attached to walls are displayed in blue; roof lines unattached to walls are displayed in pink. Individual lines highlighted with the PLAN's *Select Roof Line* tool appear in orange.

Modifying or Deleting an Existing Roof

To modify the properties of an existing roof, or to delete all or part of a roof, begin by clicking on the *Select* tool on the SketchUp toolbar. Next, click anywhere on the roof to select it. Note that, when the entire roof has been selected, its outline changes from black to blue, as can be seen in Figure 31. From here, the next step you take depends on the task you wish to complete:

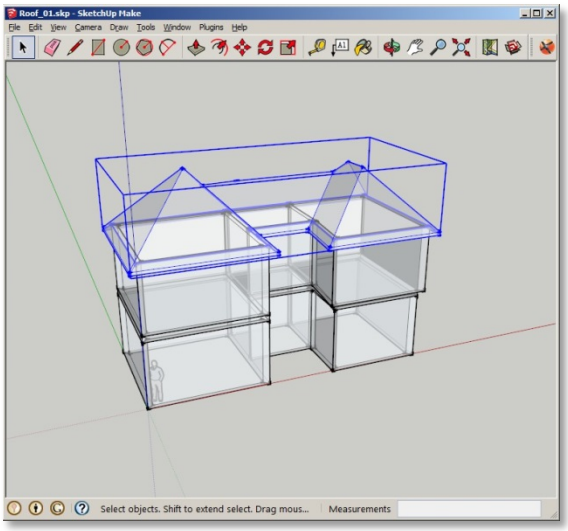

Roof_01.skp - SketchUp Make
File Edit View Camera Draw Tools Window Plugins Help
Select objects. Shift to extend select. Drag mous...
Measurements

Figure 31: To modify a roof, begin by using the SketchUp *Select* tool to select the entire roof.

- To delete the entire roof, hit the delete key on your keyboard.
- To modify the properties of your roof, click on the *Edit Roof Outline* icon on the PLAN toolbar. This places the selected roof in edit mode. Next, click on PLAN's *Select Roof Line* tool, and select the specific roof line you wish to edit by clicking on it. Note that the color of the selected line changes to orange. Change the values you want in the property fields and, when you are done, click on the *Apply Changes* button.
- To move an individual roof line, click on the *Edit Roof Line* icon on the PLAN toolbar. Next, click on the *Select Roof Line* tool on the PLAN toolbar and click on the specific roof line you wish to move. Note that the color of the selected line changes to orange. Now click on the *Move Roof Line* icon on the PLAN toolbar, and then click and drag the selected roof line to its new location. **Note:** Roof lines that are connected to a wall will move automatically, if the wall to which they are connected is moved.
- To delete an individual roof line, click on the *Edit Roof Line* icon on the PLAN toolbar. Next, click on the *Select Roof Line* tool followed by a click on the specific roof line you wish to delete. Note that the color of the selected line changes to orange. Lastly, click on the *Delete Roof Line* icon on the PLAN toolbar.

When you are satisfied with your changes, click on the *Save Changes* icon on the PLAN toolbar. To discard your changes click on the *Abandon Changes* icon on the PLAN toolbar.

WARNING! If you move a wall that is parametrically connected to your roof, and the wall move results in a model that is not sound enough architecturally to support a roof structure, your roof will "disappear." To reinstate your roof, you must click on *Edit* → *Undo* from the menu bar in SketchUp.

COMMITTING YOUR MODEL TO SKETCHUP

The *Commit* button at the bottom of the BuildEdge PLAN window is used to convert your PLAN drawing to SketchUp's format. All PLAN-related information is removed, and your model ceases to be "smart." Your walls, doors, windows, floors, and roofs cease to be parametrically connected to one another; they can no longer be modified or moved in unison as a single, cohesive unit. On the plus side, committing your model to SketchUp will allow you to apply a host of additional design features using the wide variety of tools available in SketchUp. **Note:** A model must contain at least one BuildEdge PLAN entity/object before it can be committed to SketchUp.

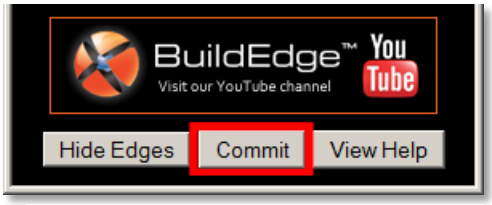


Figure 32: The *Commit* button converts PLAN objects to the SketchUp format.

To commit your model to SketchUp, deselect all PLAN objects by clicking on the SketchUp *Select* tool and clicking on a blank space somewhere in the SketchUp window. The *Commit* button becomes activated.

When you click on the *Commit* button, the window pictured in Figure 33 will pop open. Clicking on the *Yes* button dumps all objects out of BuildEdge PLAN and converts them to SketchUp objects. If you activate the *Explode Entities* checkbox before clicking on the *Yes* button, each wall will be maintained as a discreet entity. If left unchecked, all connected walls will be converted to a single group, and each individual floor and roof will be contained within its own group. Clicking on the *No* button cancels the *Commit* process and maintains the formatting and grouping of all objects that you have drawn using PLAN.

BuildEdge PLAN
Committing to SketchUp will discard all BuildEdge information. This step cannot be undone.
You will be unable to edit this drawing with BuildEdge PLAN.
Proceed?
Yes
No
Explode Entities

Figure 33: The *Commit* process cannot be undone.

WARNING! Once your model has been committed to SketchUp, there is no way to "cleanly" undo the commit process. Hitting *Control-Z* on your keyboard or *Edit* → *Undo* on SketchUp's menu bar may appear to reverse the commit process at first, however, problems and inconsistencies will eventually appear and your model will have to be recreated in PLAN in order to be fully functional.

APPENDIX A: GLOSSARY OF ARCHITECTURAL TERMS

Cantilever – A projecting structure, such as a section of floor or roof, that extends beyond the face of its carrying wall.

Eave – The overhanging edge of a roof.

Floor – A horizontal surface separating stories of a building.

Gable – The upper portion of an end wall formed by the slope of a roof.

Heel Height – A vertical dimension measured from the top of a wall to the top of a roof at the exterior face of the wall.

Hip – The line formed by the meeting of two angles in a roof framing.

Miter Joint – A joint made by beveling each of two surfaces to be joined, usually at a 45 degree angle, to form a corner, usually at a 90 degree angle.

Parametric – Of, relating to, or expressed in terms of one or more parameters.

Polygon – Any two-dimensional shape, comprised of straight lines, where the shape is closed (i.e. the lines connect).

Rafter – One of a series of parallel beams that support a roof and its associated loads.

Roof – The topmost covering of a building.

Slope – The angle or slant of a roof's incline.

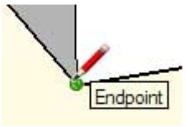
Truss – A structure comprising one or more triangular units constructed with straight members whose ends are connected at joints.

Wall – A structure that forms the side of a room or building.

Wall Opening – A window or door.

Z-Height – In any application involving three axes of movement, the vertical axis (perpendicular to the Earth) is usually defined as the "Z" axis. Z-Height refers to the position of the Z-axis. (The "blue" axis line in SketchUp.)

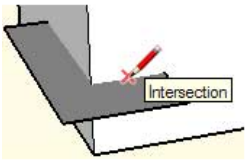
APPENDIX B: GLOSSARY OF TERMS FOR USERS NEW TO SKETCHUP



Endpoint – The Endpoint inference indicates the end of a Line or Arc entity. The Endpoint inference is represented by a green circle.

From Point – The From Point inference indicates a linear alignment from a point along the drawing axes directions. The From Point inference is represented by a dotted line whose color corresponds to the axis direction (red, green, or blue).

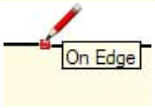
Inference – The virtual representation of an object's location within the modeling interface. There are three main types of inferences: point, linear, and planar. SketchUp often combines inferences together to form a complex inference.



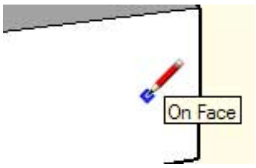
Intersection – The Intersection inference indicates an exact point where a line intersects another line or face. The Intersection inference is represented by a red x.

Linear Inference – A linear inference snaps along a line or direction in space. In addition to a tooltip, a linear inference sometimes displays a temporary dotted line while you draw.

Midpoint – The Midpoint inference indicates the middle point on a line or edge. The Midpoint inference is represented by a cyan circle.



On Edge – The On Edge inference indicates a point that lies along an edge. The On Edge inference is represented by a red square.



On Face – The On Face inference indicates a point which lies on a Face entity. The On Face inference is represented by a blue diamond.

On Red Axis – The On Red Axis inference indicates a linear alignment to the red drawing axis. The On Red Axis inference is represented by a red line.

On Green Axis – The On Green Axis inference indicates a linear alignment to green drawing axis. The On Green Axis inference is represented by a green line.

On Blue Axis – The On Blue Axis inference indicates a linear alignment to the blue drawing axis. The On Blue Axis inference is represented by a blue line.

Parallel – The Parallel inference indicates a parallel alignment to an edge. The Parallel inference is represented by a red line.

Perpendicular – The Perpendicular inference indicates perpendicular alignment to an edge. The Perpendicular inference is represented by a blue line.

Point Inference – The location of the mouse/pointer within the drawing interface.

APPENDIX C: LINKS AND RESOURCES

BuildEdge PLAN

Blog: http://www.buildedge.com/blog/

Help Desk: http://broker.gotoassist.com/h/buildedge

Contact (General): http://www.buildedge.com/contact.php

Documentation Comments and Suggestions: Send email to tballew@keymark.com

Download Free Version: http://extensions.sketchup.com/en/content/buildedge-plan

Purchase PLAN Software: http://store.buildedge.com/

Support Request (Submit): http://www.buildedge.com/help/index.php?a=add

Support Request (View Existing): http://www.buildedge.com/help/ticket.php

Tutorials: http://www.buildedge.com/tutorials.php

Update PLAN Software: http://store.buildedge.com/Home/PlanUpgrade

SketchUp

Download SketchUp: http://www.sketchup.com/download

Knowledge Center: http://help.sketchup.com/en

Extension Warehouse: http://extensions.sketchup.com/

APPENDIX D: BUILDEDGE PLAN 3.0 RELEASE NOTES

1. A complete set of walls can now be auto-generated around an existing floor.
2. A complete floor can now be auto-generated on top of a closed group of walls.
3. A complete roof can now be auto-generated on top of a closed group of walls.
4. Connection points between walls no longer display unnecessary join lines.
5. Horizontal- and vertical-divider components can now be added to windows.
6. Users can now add seven different door types to door openings.
7. Door functionality now includes the ability to specify a door's swing direction.
8. For hinged door types, hinge location (left or right) can now be specified.
9. Numerous "under the hood" fixes now provide greater application stability.
10. Doors and windows can now be placed using SketchUp snap-points as well as snap-points associated with other BuildEdge PLAN objects.
11. The Pick Line inference has been fixed so that it no longer "floats" above target walls.
12. The toggle button for drawing tools is now larger and easier to use.
13. The Auto-Wall feature is no longer restricted to drawing walls on the exterior side of the Orientation Line.
14. The BuildEdge PLAN User's Manual is now available in PDF as well as web-based format.

Known Issues

1. BuildEdge PLAN does not support multi-document functionality on Mac.
2. Using the Auto-Wall command, on a floor with walls of varying heights below it, may cause unexpected behavior.

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